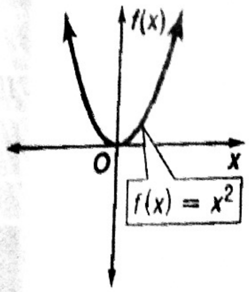
... is read x approaches positive infinity.

Concept Summary — *End Behavior of a Polynomial Function*

Degree: even
Leading Coefficient: positive
End Behavior:

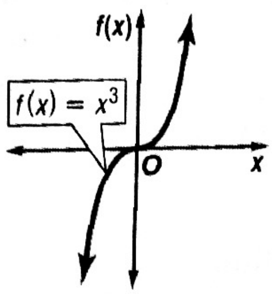
$f(x) \to +\infty$ as $x \to -\infty$

$f(x) \to +\infty$ as $x \to +\infty$



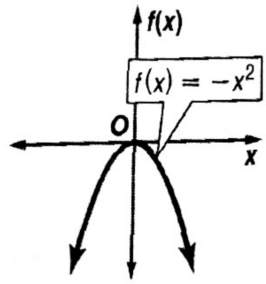
Degree: odd
Leading Coefficient: positive
End Behavior:

$f(x) \to +\infty$ as $x \to +\infty$



$f(x) \to -\infty$ as $x \to -\infty$

Degree: even
Leading Coefficient: negative
End Behavior:

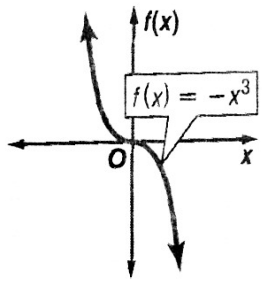


$f(x) \to -\infty$ as $x \to -\infty$

$f(x) \to -\infty$ as $x \to +\infty$

Degree: odd
Leading Coefficient: negative
End Behavior:

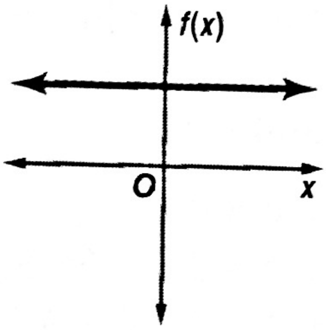
$f(x) \to +\infty$ as $x \to -\infty$



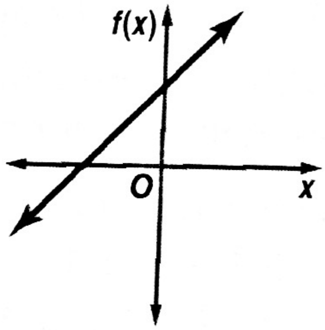
$f(x) \to -\infty$ as $x \to +\infty$

GRAPHS OF POLYNOMIAL FUNCTIONS The general shapes of the graphs of several polynomial functions are shown below. These graphs show the *maximum* number of times the graph of each type of polynomial may intersect the x-axis. Recall that the x-coordinate of the point at which the graph intersects the x-axis is called a *zero* of a function. How does the degree compare to the maximum number of real zeros?

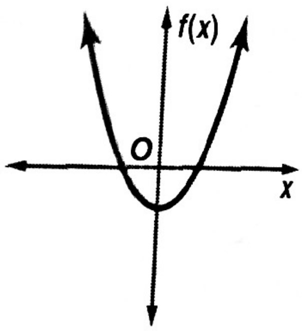
Constant function
Degree 0



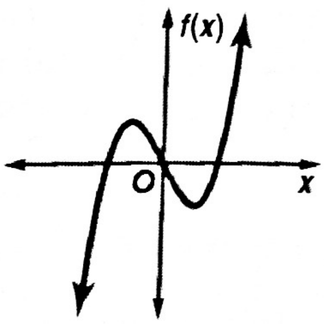
Linear function
Degree 1



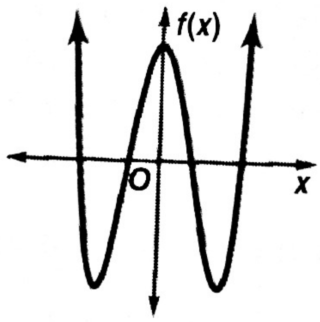
Quadratic function
Degree 2



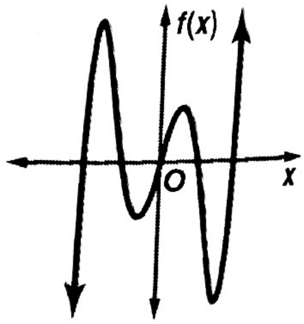
Cubic function
Degree 3



Quartic function
Degree 4



Quintic function
Degree 5



Notice the shapes of the graphs for even-degree polynomial functions and odd-degree polynomial functions. The degree and leading coefficient of a polynomial function determine the graph's end behavior.